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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,522	12/13/2005	Yoshio Harada	P28972	6373

7055 7590 09/21/2007

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EXAMINER	
GUGLIOTTA, NICOLE T	

ART UNIT	PAPER NUMBER
1709	

NOTIFICATION DATE	DELIVERY MODE
09/21/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com
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Office Action Summary	Application No.	Applicant(s)	
	10/560,522	HARADA ET AL.	
	Examiner	Art Unit	
	Nicole T. Gugliotta	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *9, 10 and 16* is/are allowed.

6)☒ Claim(s) *1 - 8, 11- 15, and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :3/13/2006, 3/17/2006, 3/29/2006, 6/15/2007 .

DETAILED ACTION

Specification

1. The claims and specification are generally narrative and indefinite, failing to conform to current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 - 7, 14, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Maeda (U.S. Patent No. 6,852,433 B2).

4. Applicant claims a yttrium oxide (Y_2O_3) spray coating characterized by covering a surface of a substrate with a Y_2O_3 black spray coating for a top-layer. The middle layer may be comprised of Al_2O_3 or a double oxide of Al_2O_3 and Y_2O_3, solid solution or mixture thereof. The black yttrium oxide is manufactured in an environment of a heat source for atmospheric plasma spraying surrounded with inert gas (i.e. Ar or N_2). In

addition, it is claimed that the black Y_2O_3 particles, whether blackened on the outer peripheral portion or the inside of the Y_2O_3 particle, is 50 – 2000 μm in thickness.

5. Maeda discloses a thermal spray coating layer of a rare-earth earth oxide, such as yttrium oxide, that is gray or black in color (Column 1, Lines 50 – 52 and 60 – 64). It is also disclosed that a double oxide of a rare earth oxide, such as yttrium oxide, and aluminum oxide, silicon oxide, zirconium oxide or indium oxide is another alternative for this coating (Column 2, Lines 30 – 33). The thermal spraying processes used for his invention was plasma spraying or low-pressure plasma spraying. The plasma gases that may be used include nitrogen/hydrogen, argon/hydrogen, argon/helium and argon/nitrogen (Column 3, Line 66 – Column 4, Line 6). Maeda discloses the thermal spray coating to have a thickness of 50 – 500um (Column 3, Lines 57 – 59).

6. Maeda anticipates the invention of a Y_2O_3 black spray coating on the surface of a substrate, the thickness of the coating, and the method of making using an inert gas and low pressure. Maeda's disclosed thickness of the spray coating is commensurate with applicant's claim because it is within the range value claimed.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda, in view of Borglum (U.S. Patent No. 5,004,712).

9. Applicant claims a white Y_2O_3 powdery material is plasma-sprayed directly on a surface of a substrate or onto the surface of the substrate in an inert gas atmosphere substantially containing no oxygen to form a Y_2O_3 black spray coating.

10. Maeda discloses a white Y_2O_3 powdery material that is plasma-sprayed directly on a surface of a substrate or onto the substrate in an inert gas atmosphere. Maeda discloses the powder is subjected to firing at a temperature of 1500-1800C in a vacuum or a reducing atmosphere to thereby obtain a rare-earth oxide powder for thermal spraying that has a gray or black color (Column 3, Lines 34 – 38). Maeda further discloses the plasma gasses that may be used to include nitrogen/hydrogen, argon/hydrogen, argon/helium and argon/nitrogen (Column 4, Lines 3 – 6). Maeda's disclosure does not mention the term "oxygen".

11. Borglum discloses a yttria body exposed to a reducing (oxygen deficient) environment that results in a dark or black cast to the material (Column 2, Lines 23 – 29).

12. First, it would be obvious to one skilled in the art at the time the invention was made that an inert gas atmosphere would contain substantially no oxygen because oxygen is a reactive gas. By definition, an inert gas is a gas that is not reactive, or

specifically in this case, is not an oxidizing agent. Therefore, an inert gas atmosphere would be oxygen deficient.

13. Second, it would be obvious to one skilled in the art at the time the invention was made that a vacuum or a reducing atmosphere, as disclosed by Maeda, would contain substantially no oxygen. A reducing environment, by definition, is one that is deficient in oxygen. In addition, the plasma gasses used by Maeda are all inert gasses in this case. Therefore it would be obvious to have an inert atmosphere with substantially no oxygen for the plasma spraying process.

14. It would be obvious to one skilled in the art at the time the invention was made that an oxygen deficient environment would turn a yttria material black, based upon the disclosure of Borglum. Whether Borlgum was intentionally trying to create a black yttria body or not is not important. Nevertheless, Borglum disclosed that by inadvertently exposing the yttria body to an oxygen deficient body would result in the black yttria material. Therefore it would be obvious to one skilled in the art at the time the invention was made that if one wanted a black yttria body they would expose it to an oxygen-free environment.

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda & Borglum.

16. Applicant claims the inert gas was used at an atmospheric low pressure of 50 – 600 hPa.

17. Maeda discloses the thermal spraying process to be plasma spraying or low-pressure plasma spraying.

18. It would be obvious to one skilled in the art at the time the invention was made that a low pressure atmosphere of an inert gas would be best for making a black yttrium oxide coating on a substrate, based upon the teachings of Maeda. Therefore to state a specific pressure range that would be considered low-pressure for plasma spraying to one skilled in the art does not present new information to the art.

19. Claims 2, 3, 5, 11, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda, in view of Borglum, in further view of Harada et al. (JP 2001-164354).

20. Applicant claims covering a surface of a substrate with a Y_2O_3 black spray coating, with an undercoat made of metal, a middle layer comprising aluminum oxide (Al_2O_3) or a double oxide of Al_2O_3 and Y_2O_3, and a top coating layer of Y_2O_3 black spray coating.

21. Maeda teaches a black Y_2O_3 thermal (plasma) spray coating. Maeda does teach the application of the coating onto a metal surface, but does not teach an intermediate layer of both Al_2O_3 and Y_2O_3 in order to have a gradual change in the thermal expansion coefficient, from the substrate to the black Y_2O_3 spray coated layer.

22. Harada et al. disclose a method for manufacturing a yttrium oxide sprayed coating on a substrate by having a first coating of metal, an intermediate layer of Al_2O_3 and a top coating of Y_2O_3 sprayed onto the intermediate layer (Abstract).

23. It would be obvious to one skilled in the art at the time the invention was made to have a surface of a substrate with black spraying coating, an undercoat of metal, a middle layer of aluminum oxide or a double oxide with yttrium oxide, and a top coating of black yttrium oxide because it well known in the art. Applicant admitted in their specification that the black yttrium oxide coating would have the same benefits as the white yttrium oxide coating. Therefore it would be obvious to have the same layers between the substrate and the top black yttrium oxide coating as has already been done with white yttrium oxide coating.

24. It is important to have a gradual change in the thermal coefficient between the substrate and the top layer in order to prevent peeling and flaking of the coating. Therefore there an undercoat and an intermediate coat are added between the topcoat and substrate. The undercoat is usually a metal with a thermal expansion coefficient between the substrate and the intermediate layer. The intermediate layer is a combination of the top coating and the undercoating so as to have a thermal expansion coefficient value between the undercoat and the topcoat. Therefore it would be obvious to one skilled in the art at the time of the invention to have a undercoat of metal, an intermediate layer of Al_2O_3 and a top coating of Y_2O_3, due to their thermal expansion coefficient values.

25. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda, in view of Harada et al. (JP 09-069554, Published 3/11/1997).

26. Applicant claims a black Y_2O_3 spray-coated with an undercoat of a metal coating made of a least one metal or alloy selected from nickel (Ni) and its alloy, tungsten (W) and its allow, molybdenum (Mo) and its alloy, titanium (Ti) and its alloy, aluminum (Al) and its alloy, and magnesium (Mg) alloy at a thickness of 50 – 500 μm.

27. Maeda teaches a black Y_2O_3 thermal (plasma) spray coating. Maeda does teach the application of the coating onto a metal surface, but does not teach the application of a metal undercoating between the substrate and the coating.

28. Harada et al. disclose a $Al_2O_3.TiO_2$ based ceramic spray coating with a thickness of 50 – 500,,m.

29. It would be obvious to one skilled in the art at the time the invention was made to have a metal spray coating comprised of Al_2O_3 and TiO_2, of a thickness of 50 – 500 μm, as it is previously known in the art shown by the 1997 publication of Hamada et al.

Allowable Subject Matter

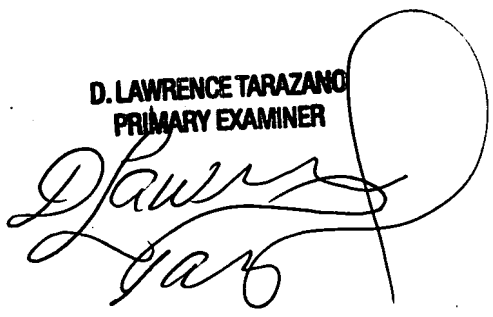
30. Claims 9, 10 and 16 are allowed. No prior art has been found in a method of making black Y_2O_3 spray coating from white Y_2O_3 via electron beam or laser beam technology.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole T. Gugliotta whose telephone number is 571-270-1552. The examiner can normally be reached on M - F (first Friday off) 7:30 a.m. - 5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1550. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Nicole T. Gugliotta
Examiner
Art Unit 1709